BARRAGE

The RCA Museum News

THE RCA MUSEUM
CANADA'S NATIONAL ARTILLERY MUSEUM

LE MUSÉE NATIONAL DE L'ARTILLERIE DU CANADA
LE MUSÉE DE L'ARC

October 2024

Over the Top: Canada and the First World War

Running from July 2024 to August 2025

We opened our new temporary exhibit, marking the 110th anniversary of the start of the First World War. In 1914, Canada demonstrated its dedication to the British Empire and willingness to support the Allied cause by mobilizing the First Contingent of 30,000 soldiers for overseas duty.

Canada established training camps, such as Camp Sewell in Manitoba, to prepare Canadian soldiers for overseas service. Canadians adapted quickly to trench warfare, particularly during battles like the Second Battle of Ypres in 1915. The Canadian Artillery provided vital fire support. They helped break enemy defences, supported infantry advances, and repelled German attacks.

Notable themes in the exhibit include War Comes to Canada, the First Contingent, Training Camps, the Salisbury Plain, the Canadian Artillery in 1915, Forage Caps and Brodie Helmets, Ross & Lee-Enfield Rifles, Trench Warfare, the Second Battle of Ypres, Machine Guns, and Gas Attacks. The main feature of the exhibit is a trench wall. Staff started work on the trench months in advance and forklifted it into place. Above the trench, we included a video of Allied soldiers in the trenches and no-mans-land.

Featured artifacts include an 18-pounder field gun, a German 7.7cm Feldkanone NA 96, and a 17cm Minenwerfer. We added two machine gun pits – an Allied pit with a Lewis Gun and Vickers Machine Gun and a German pit with an MG08 and MG08/15. Other artifacts include bayonets, caps, fuses, gas masks, grenades, helmets, journals, manuals, pins, photographs, postcards, rifles, shells, souvenirs, swords, tins, and miscellaneous items.

New Museum Employees

The RCA Museum is pleased to introduce its two new permanent team members, William Brandon and Lisa Fischer. William accepted the role of Collection Manager, overseeing the museum's extensive collection, while Lisa accepted the role of Client Service Provider, managing the day-to-day administrative tasks. We extend our warmest welcome to William and Lisa and express our gratitude for choosing to join our team.

William Brandon

I was born in Pennsylvania, US, and moved to Manitoba when I was six. I have always been interested in history, in particular, military history. I joined the 26 Field Regiment, RCA, when I was seventeen and obtained the rank of Bombardier. After graduating from Souris School, I enlisted in the United States Marine Corps. After an honourable discharge from the Marines, I attended Florida State University in Tallahassee, Florida, where my focus of study was history and anthropology. After graduating from university, I returned to Manitoba and enrolled in the Canadian Reserve again at the 26th Field Regiment, where I am currently the training officer. Before starting my new position as Collection Manager at the RCA Museum, I was employed at RPOU here at CFB Shilo. I feel incredibly fortunate to have found a position at the RCA Museum where I can expand on my interest and passion for military history.

Lisa Fischer

Initially from Brandon, Lisa has always been captivated by military history, a passion sparked by childhood conversations with her grandfather. This early interest has significantly influenced her life's path. For the past 18 years, Lisa has worked at CFB Shilo in various administrative and accounting roles. Married with two daughters, Lisa blends her career with her family life. Her interests extend beyond the professional realm; Lisa is an avid reader, gamer, and fan of period dramas. These hobbies provide relaxation and align with her love for historical narratives and detailed storytelling. Period dramas offer her a chance to delve into different eras and historical contexts, complementing her passion for military history. Travel is another significant aspect of Lisa's life. Her ideal vacation involves exploring Europe's rich tapestry of historical sites, reflecting her desire to experience history firsthand. Recently, she took a trip to Nova Scotia, where she relished the local cuisine, particularly a delicious lobster roll, and enjoyed a tour of the Citadel in Halifax. Lisa's experiences and interests create a vibrant picture of someone who values personal and professional growth. Her journey, combined with her diverse hobbies and travel aspirations, showcases a life dedicated to learning, exploration, and enjoyment of both history and family.

An Afternoon with Ross Rifles at the RCA Museum

Six participants of the Ross Rifles event with Graeme Chapman seated back-right on August 17th, 2024.

On Saturday, August 17th, our returning summer student, Graeme Chapman, took the lead in hosting *An Afternoon with Ross Rifles at the RCA Museum*. He asked to lead the initiative shortly after starting employment this year in May 2024. A suggestion, I readily approved, especially given our upcoming temporary First World War exhibit, which features a Ross Rifle and its significant role in the war.

Ross Rifles, a tabletop role-playing game by Dundas West Games, offers a unique learning experience. Participants step into the shoes of the Canadian Expeditionary Force soldiers on the Western Front, gaining a good understanding of life in the trenches and no-mans-land with a narrative-focused storyline. It's a distinctive way to comprehend the realities and horrors of trench warfare.

Despite our best efforts to promote the event, we had a modest turnout of six participants. However, those who attended thoroughly enjoyed the event and expressed a desire to continue playing beyond the museum's hours of operation. In addition to facilitating the Ross Rifles event, which added excitement and a personal touch, Graeme played a key role in developing our temporary First World War exhibit. His idea to play the game inside the exhibit space, which he helped create, made the event entertaining and helped to highlight the experiences of Canadians who fought in WWI.

Our Facebook post about the Ross Rifles event at the museum garnered a wave of positive feedback, reaching over six thousand people. This significant reach, the largest in the past three months, is a testament to the success of Graeme's initiative. His leadership in connecting a historical role-playing game with our military museum made history engaging and noteworthy, offering a fresh perspective on the experiences of Canadian soldiers in WWI.

By Andrew Oakden

Miniature Cannons

How does this exhibit connect with visitors?

We recently placed miniature cannons in an attention-catching new display case. The nine miniature cannons, each a different model, have unique stories to tell. Artillery systems are typically large and intimidating, making it hard for most visitors to relate. These small cannons don't have that intimidation factor. These visually appealing and engaging artifacts are aimed directly at visitors, inviting them to interact and learn.

The 19th-century miniature cannons symbolize the formative period of the Canadian Artillery. These cannons, though small, played a significant role in helping the Canadian Artillery, a key player in our nation's military history. Their historical significance is rooted in the British military's extensive use of cannons throughout the Napoleonic Wars (1803-1814) and the Crimean War (1853-1856). The Canadian Artillery, which deployed many of these models during the 19th century, was significantly influenced by these cannons, shaping military strategies and tactics.

We want our visitors to engage with the artifacts on display. We have approximately 65,000 artifacts in our collection, but most will never be displayed. Some of the most elaborate and notable artifacts are small. The display of miniature cannons serves as a visual treat and an excellent educational tool. It offers a unique learning experience with limited labelling. As museum director, I want visitors, especially kids, to interact and connect with our artifacts. This simple yet visually engaging display is a window into Canadian military history.

Exhibits in museums must engage their audience to be meaningful. If visitor engagement is high, then the exhibit is practical. These cannons are more than just artifacts - they provide an interactive experience to keep visitors engaged during their visit. Museums must continually evolve and display new items to encourage audience participation and engagement. We hope our visitors will take the time to check out the miniature cannon display.

By Andrew Oakden

The No. 106 Fuse during the Battle of Vimy Ridge

The Battle of Vimy Ridge is Canada's most celebrated military victory during WWI. Yet few remember the extensive artillery bombardment before the battle or the highly effective use of the instantaneous No. 106 fuse.

No. 106 fuse on display at the museum.

Over 35,000 British and Canadian troops operated over 1,000 guns and fired 1,000,000 rounds, bombarding the ridge for three solid weeks, from March 20 to April 9, 1917. They focused on barbed wire, dugouts, machine-gun emplacements, trench junctions, tunnel entrances and strong points. Canadians destroyed 83% of enemy guns with counter-battery fire and cleared wide paths of barbed wire defences, allowing the Canadian Corps to advance and take the ridge on April 12, 1917.

The Canadians didn't attempt to destroy all the enemy trenches. Instead, they went after wire entanglements and barbed wire defences to clear paths for the infantry. To remove the barbed wire, they used the new instantaneous No. 106 fuse with high explosive shells that detonated on impact with barbed wire. They used it mainly with 18-pounders, 4.5-inch howitzers, and 6-inch guns.

The British and the Allies began the war with field guns firing shrapnel shells with time and percussion fuses that burst over the heads of enemy soldiers. Traditional percussion fuses were slow to explode and commonly penetrated the ground before exploding. Shells would land in mud, bury, and explode, and the earth would absorb the energy. Traditional fuses did not work effectively with trench warfare.

The British experimented with graze fuses in late 1915, but they were not instantaneous and lacked sensitivity, causing delays in firing explosive charges. They did not consistently explode on soft targets, including trench walls and barbed wire. The solution to this problem came with the invention of the instantaneous percussion fuse, No. 106. The fuse used French technology to reliably detonate a high-explosive charge when it contacted any object, including barbed wire.

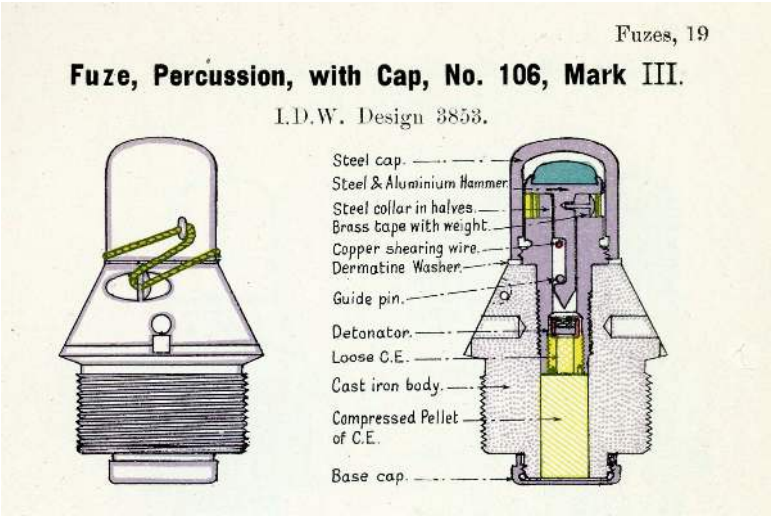


Diagram of No. 106 fuse from *Handbook of Ammunition*, 1918.

To operate the fuse, the Gunner removed the safety cap, loaded the projectile with the fuse attached, and fired the gun. The projectile with the fuse accelerated violently through the barrel, pulling back the hammer. When the shell left the barrel, the speed dropped and caused the hammer to move forward in the readied position. The projectile flew and then hit a target. The hammer, with an axial rod, retracted, hitting the detonator cap and causing an instant explosion.

Trench warfare required high explosive shells with instantaneous fuses that destroyed enemy formations upon contact. The British started using the No. 106 during the Battle of the Somme in 1916, with widespread use in 1917. The new fuse worked very well and detonated with the slightest impact. The ultra-sensitive, direct-action fuse even exploded on soft ground. Only physical contact with the protruding hammer or the nose of the fuse caused detonation. Protection included a soft aluminum cap that absorbed glancing blows, reducing misfires.

The Battle of Vimy Ridge set a new standard for artillery support to deal with well-defended enemy positions and counter-battery attacks. Canadians used the No. 106 fuse extensively during the battle and after until the war ended. It was a highly effective, instantaneous, direct-action percussion fuse for barbed wire removal and counter-battery fire. In a later version, No. 106, Mark VII added a secondary safety mechanism that reduced misfires. Versions of the fuse remained in service into World War II.

By Andrew Oakden

The Canadian Artillery in the Great War, 1914-15

In August 1914, Canada mobilized tens of thousands of troops as part of the Canadian Expeditionary Force. In 1915, Canada deployed many of these soldiers to the Western Front in France and Belgium, where they faced formidable German defences.

Early in the war, military leaders and strategists emphasized offensive, rapid advance manoeuvres or 19th-century warfare tactics, such as cavalry charges. However, advancements in weaponry, particularly machine guns, artillery, and rifles, made it exceedingly difficult for attacking forces to break through well-fortified defensive positions.

The technological developments in weaponry during this period heavily favoured defensive manoeuvres. Machine guns could destroy advancing infantry with devastating efficiency, while artillery barrages could destroy attacking forces before they even reached enemy lines. This prompted both sides to dig extensive networks of trenches to provide cover and protection from enemy fire.

The landscape of the Western Front, in Belgium and France, lent itself well to trench warfare. The flat terrain provided little natural cover, requiring soldiers on both sides to dig trenches for protection. Moreover, the trench networks stretched for five hundred miles, creating an interconnected system that facilitated defensive operations.

Canadian Troops in a Communication Trench, 1915.

Forage Caps to Brodie Helmets

During the First World War, Canadian soldiers initially wore cloth forage caps with their uniform. While the forage cap provided some protection from the elements, it offered minimal protection against shrapnel, bullets, or other battlefield hazards.

As the war progressed and the realities of trench warfare became more apparent, the need for better head protection became evident. This led to the adoption in September 1915 of the Brodie Helmet, also known as the "tin hat," as standard headgear for British and Commonwealth soldiers, including Canadians.

The British designed the Brodie steel helmet to provide head protection against shrapnel, shell fragments, and other projectiles. It featured a distinctive shape with a wide brim and a shallow dome, offering coverage to the top and sides of the head.

The Brodie helmet was lightweight and worn comfortably over other headgear, such as caps or balaclavas. Its adoption marked a significant improvement in head protection for soldiers, reducing casualties from head injuries on the battlefield.

Ditching the Ross Rifle for the Lee-Enfield Rifle

The Canadian Army adopted the infamous Mark 3 Ross Rifle at the request of Sir Sam Hughes, the Minister of Militia and Defence, before the outbreak of WW1. The Canadian-designed infantry rifle was very accurate, but prone to jamming, especially in the harsh conditions of trench warfare. Its tight tolerances and complex design made it susceptible to fouling from dirt, mud, and debris common in trench warfare.

Due to these operational deficiencies, Canadian soldiers expressed their dissatisfaction. During the Second Battle of Ypres (April to May 1915), where Canadian troops faced the first large-scale gas attacks, soldiers ditched the Ross Rifle and used different weapons from dead soldiers.

In response, the Canadian military replaced the Ross Rifle with the British-designed Lee-Enfield rifle as the standard infantry weapon for Canadian troops serving overseas. The British and Commonwealth forces used the .303-calibre Short Magazine Lee-Enfield (SMLE) Mark III, known for its reliability, ruggedness, and ease of maintenance.

Mark 3 Ross Rifle

Mark III Short Magazine Lee-Enfield (SMLE)

Machine Guns and WW1

During WW1, the Allies and Central Powers deployed machine guns extensively on the battlefront. Hiram Maxim designed the original concept for the machine gun in the nineteenth century. The Allies commonly used an updated British-designed Vickers Machine Gun, while the Central Powers deployed a German-designed MG08 Machine Gun (Maschinengewehr 08).

The Vickers and MG08 were similar in functionality and lethality on the battlefield. These similarities included firing at 450–500 rounds per minute, water-cooled and belt-fed, delivering sustained, rapid-fire, and with a single operator. In comparison, they fired different cartridges, with the MG08 using the 7.92mm Mauser cartridge and the Vickers using the .303 British cartridge. The MG08 was significantly heavier than the Vickers, making it difficult to transport.

Both alliances deployed machine guns to defend well-fortified defensive positions, including trenches, inflicting heavy casualties on opposing forces. The MG08 (left) and the Vickers (right) were formidable weapons that shaped military strategy in WW1.

By Andrew Oakden

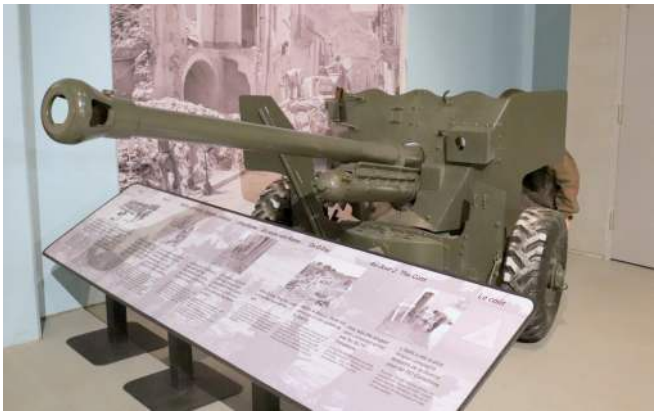
Anti-Tank Guns and Ammo during WW2

During the Second World War, Canada had seven anti-tank regiments with guns in the First Canadian Army, in the divisions and corps, playing a pivotal role. Their support was essential and strategic, as they formed a crucial part of the battalion's defence plans, providing vital support to infantry units. Canada operated anti-tank batteries with guns individually, assigned them to a general area, and typically with infantry companies as the go-to defence against enemy tanks. Anti-tank guns supported the infantry in assaults and helped to protect against counter-attacks. Commanders used them aggressively against houses, bunkers, and strong points.

The Royal Canadian Artillery's journey with anti-tank guns during WW2 was a testament to progress and innovation. Starting with the 2 Pounder Anti-Tank Gun, the RCA upgraded to the 6 Pounder in 1942 and the 17 Pounder in 1943, showcasing a continuous evolution in military capabilities.

2 Pounder Anti-Tank Gun on base.

The 2 Pounder Anti-Tank Gun, or 40 mm, provided a formidable defence against enemy tanks starting in 1937. Crafted by Vickers and Woolwich Arsenal, towed and self-propelled variants offered direct fire protection against the German Army's Blitzkrieg tactics. The 2 Pounder had a maximum range of 8,000 yards but was only effective up to 500 yards with an armour-piercing round.



6 Pounder Anti-Tank Gun in the RCA Museum.

By 1942, the rapidly advancing German tanks necessitated a more powerful weapon. The 6 Pounder Anti-Tank Gun, or 57 mm, was a game-changer. With enhanced range and armour penetration capabilities, Gunners fired rounds at 3,000 ft/s. It was in all theatres until 1945 and continued in Canadian service until 1957.

The UK developed the 17 Pounder or 76.2 mm (3-inch gun) in 1941. The first production was in the spring of 1942 and went into battle in 1943 in North Africa. The 17 Pounder could effectively counter the heavily armoured tanks, notably the German Panther and Tiger Tanks, altering the balance of power on the battlefield. The barrel could depress to -6 degrees and elevate to 16.5 degrees with an effective rate of fire of ten rounds a minute. Depending on the round, it fired a three-inch (76.2mm) high-velocity shell travelling 3,000 to 4,000 ft/s.

The factors involved in anti-tank round penetrating the armour of a tank are very complex. Most conventional anti-tank rounds have no fuse and are solid shot. They focus on kinetic energy, which uses high-speed impact to smack through armour plates. The projectile's speed is more significant than the projectile's mass. The 6 Pounder and 17 Pounder, fired at high velocities, achieving over 3,000 ft/s with some rounds. Canada also had high explosive rounds for anti-tank guns but did not deploy them regularly against enemy tanks. High explosives rounds focus on chemical energy to penetrate metal plates.

17 Pounder Anti-Tank Gun on base.

One challenge with penetrating tanks was that they continuously moved at angles, rarely at right angles. Most tanks during WW2 had slopping armour, a design feature intended to protect against anti-tank rounds. The sloped metal plate creates complex ballistic equations for penetration at a specific range. This sloped armour presented a significant challenge for anti-tank guns, requiring precise calculations and high-velocity rounds to penetrate effectively. In general, the higher the velocity, the greater the penetration of the anti-tank round.

The RCA Museum has an excellent collection of Allied standard anti-tank rounds during WW2. The photo includes 2 Pounder, 6 Pounder and 17 Pounder ammunition variants. Note the flathead training rounds. Many of the rounds incorporated a tracer component, especially after WW2.

Early in WW2, Canada stocked armour piercing (AP) and armour piercing capped (APC) rounds. Both rounds had a solid hardened steel core and round top, with the capped version adding a soft metal ballistic cap. The soft cap gripped a sloped armoured plate, and the hardened steel core penetrated tank armour. The RCA Museum has armour-piercing rounds in the 2 Pounder, 6 Pounder and 17 Pounder variants.

The second standard round was the armour-piercing capped ballistic capped (APCBC); this round was more effective against sloped hardened armour. They designed the APCBC round with a long cone to minimize air resistance. The photo shows examples of rounds for the 2 Pounder, 6 Pounder and 17 Pounder.

6 Pounder AT rounds, from the left: AP, APCBC, APDS, and training round.

The most effective round was the armour-piercing discarding-sabot shot (APDS). This shot increased the maximum velocity in the 17 Pounder version to almost 4,000 ft/s. The round included a heavy tungsten core held in place by a soft metal carrier or sabot, matching the total diameter of the barrel. When fired, the sabot separated from the tungsten core into three discarded pieces. The tungsten core then travelled to the target with maximum velocity and impact force. Canadians used this round with the 6 Pounder and 17 Pounders, with two examples above.

The APDS for the 6 Pounder and 17 Pounder was highly effective starting in August 1944 in NorthWest Europe. The 17 Pounder APDS round could penetrate the armour of the German Tiger I and Panther Tanks at two thousand yards. The 6 Pounder APDS round had more penetrating ability than the standard 75mm Sherman tank round. However, it was not accurate and commonly missed the target. The round was costly, and Gunners more commonly fired the APCBC round unless the target required the more specialized APDS round.

The fourth type of round was the high explosive (HEAT) round for anti-tank. Anti-tank could fire heat rounds, resulting in explosive release of energy at right angles to the surface, which formed long jets of molten steel at up to 30,000 ft/s, which could puncture armour. Anti-tank regiments used explosive rounds against armoured targets such as fortifications and buildings, but the rounds had minimal use against tanks. The infantry used HEAT rounds with the 2 Pounder and Anti-Tank PIAT and US Bazooka rocket launder.

The gun was the most common form of anti-tank defence during the Second World War. They were simple, robust systems and often effective solutions against German armour. During WW2, the Allies harnessed the power of high-velocity rounds to significant effect against notably the German Panther and Tiger Tanks. These armour-piercing solid shot rounds fired at 3,000 to 4,000 ft/s, penetrating even the thickest armour plates. While the barrel life was limited, the high-velocity rounds proved a game-changer in the battle against enemy tanks.

17 Pounder AT rounds, from the left: APC, APCBC, and APDS.

By Andrew Oakden

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Contact Us

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Telephone : (204) 765-3000 Ext. 258-3570
Fax:(204) 765-5289
Email: rcamuseum@forces.gc.ca
Website: rcamuseum.com
Facebook: RCA Museum

The Royal Canadian Artillery Museum (The RCA Museum)
Building N-118
CFB Shilo
P.0. 5000, Station Main
Shilo, Manitoba R0K 2A0

Musée de l'Artillerie royale canadienne
(Musée de l' ARC)
Bâtiment N-118
BFC Shilo
C.P. 5000, succursale Main
Shilo (Manitoba) R0K 2A0

Telephone : (204) 765-3000 poste 258-3570
Facsimile : (204) 765-5289
Courriel : rcamuseum@forces.gc.ca
Site Web : rcamuseum.com
Facebook: RCA Museum

Director/Directeur	Andrew Oakden	Ext/poste 258-3763
Senior Curator (On Leave)	Jonathan Ferguson	Ext/poste 258-3531
Assistant Curator/Conservatrice adjointe	Dayna Barscello	Ext/poste 258-3577
Collections Manager/Gestionnaire des collections	William Brandon	Ext/poste 258-4563
Front Desk/Reception	Lisa Fischer	Ext/poste 258-3570